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Integrated Methodology for the Application of Regional Anesthesia: A Seamless Analgesia Protocol from the Prehospital to the In-Hospital Phase

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Abstract

This methodology constitutes a comprehensive, standardized protocol designed to ensure continuity of analgesia for patients, primarily those with extremity trauma, throughout the entire care pathway, from the moment of first aid in the prehospital setting to completion of treatment in the hospital. The persistent problem of fragmented analgesia, typified by inadequate pain therapy (oligoanalgesia) delivered by emergency medical services (EMS) and the subsequent loss of continuity upon transfer to the emergency department, precipitates pain escalation, a cascade of pathophysiological stress responses, and a heightened risk of complications such as delirium and chronic pain. The objective is to present a systematic, reproducible, integrated methodology that guarantees a seamless transition between care phases. Scientific novelty lies mainly in a developed joint diagnostic-therapeutic algorithm that includes both prehospital and in-hospital anesthesiological phases. Indications and contraindications, as well as ultrasound-guided methods for performing core blocks (femoral nerve block and fascia iliaca block), are described and interpreted in a systematic way as part of this study. The remaining chapters cover hospital admission, conversion of the single-shot blockade to a catheter-based technique, and the principles of regional anesthesia as part of multimodal analgesia. The key to the book's coherence is the adoption of a communication/data transfer protocol, IMIST-RA, that the author adapted from standard handover protocols to regional anesthesia-specific features. It can lead to better clinical outcomes, greater patient satisfaction, and a more optimized use of resources.

Keywords: *Prehospital Regional Anesthesia, Seamless Continuity of Analgesia, IMIST-RA Data Handover Protocol, Ultrasound Guidance, Perineural Catheter.*

INTRODUCTION

Acute pain is among the most frequent symptoms encountered by emergency medical services (Häske et al., 2024). In patients with traumatic injuries, especially fractures of long bones and the femoral neck, pain is often severe and becomes the dominant determinant of both the patient's psycho-emotional status and initiation of neuroendocrine stress cascades (Reed & Schurr, 2020). Despite this, current analgesic practice at prehospital and early in-hospital stages is characterized by significant fragmentation (Li et al., 2024).

The problem is compounded by oligoanalgesia, insufficient or delayed pain treatment in the prehospital phase (Ferri et al., 2022). Studies indicate that a substantial proportion of patients (up to 79% in some samples) do not receive adequate pharmacologic therapy before hospital arrival. The causes are multifactorial: lack of standardized protocols, insufficient training, and concerns regarding adverse effects of systemic analgesics, primarily opioids (e.g., hypotension, respiratory depression, sedation) (Häske et al., 2017). Even where protocols exist, adherence remains low.

Fragmentation persists at hospital handover. The absence of a unified, seamless protocol for documenting performed analgesia (or reasons for non-performance) obliges emergency department (ED) staff to restart assessment and analgesic planning from scratch. This creates a temporal vacuum in analgesia, amplifying suffering, impairing care, and increasing complication risk. Inadequate acute pain control predicts chronicity and postoperative delirium, particularly in older adults. However, there are no existing guidelines describing the transition from prehospital to in-hospital care (Powell et al., 2022).

This method seeks to produce an organized, reproducible method that allows a continuity of RA from the scene of the injury through the postoperative ward, integrating a series of isolated interventions into a unified, controllable process.

Scientific novelty lies in articulating a unified, seamless approach. In contrast to disparate existing protocols, this methodology, for the first time, integrates EMS activities with hospital anesthesiology within a single diagnostic-therapeutic algorithm. Its core is not only the implementation of RA in the prehospital setting but also a standardized communication and data-transfer system that guarantees the in-hospital phase proceeds as a logical continuation rather than a duplication of prehospital care.

CHAPTER 1. PRINCIPLES AND PROTOCOLS OF REGIONAL ANESTHESIA IN THE PREHOSPITAL SETTING

Implementation of regional anesthesia in prehospital practice (P-RA) represents a substantial advance over standard systemic opioid therapy. P-RA can offer more effective, targeted, and longer-duration analgesia than systemic analgesics, particularly in the case of lower limb fractures (Steenberg & Møller, 2018). Its use has practical constraints in the pre-hospital setting because training is needed, and on-scene times may increase (Sonawane et al., 2022). Overcoming these barriers requires systems with standardized protocols and tools for ensuring equitable care and patient safety.

Patient Assessment and Indication Algorithm

A precise decision algorithm for EMS personnel is pivotal to safe P-RA deployment. The decision to block must not be situational; it must adhere to an approved stepwise scheme prioritizing safety and rapid assessment (Fig. 1).

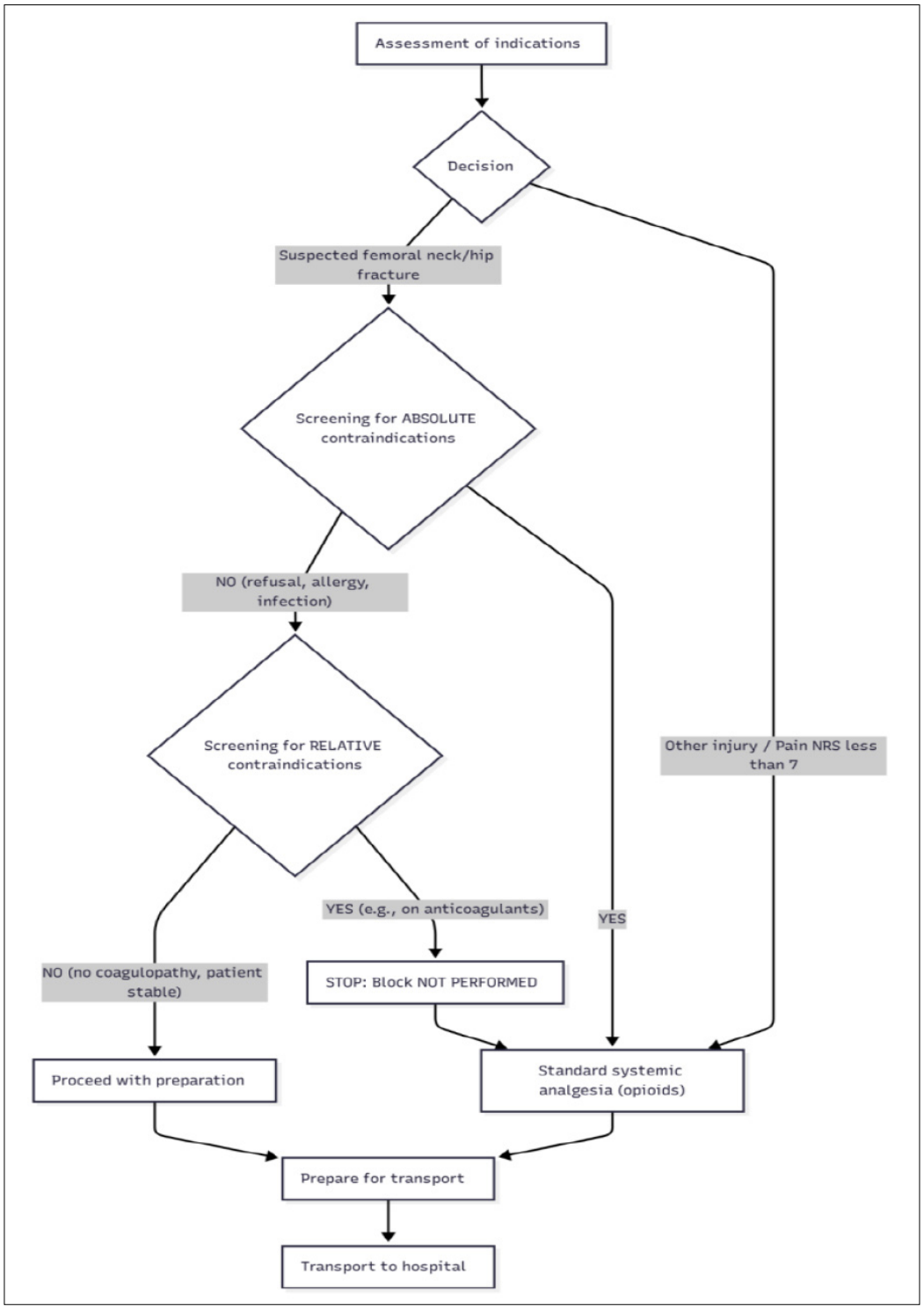

Fig. 1. Prehospital decision-making algorithm for RA

The algorithm begins with a primary assessment of a patient with acute trauma and significant pain, typically using the Numeric Rating Scale (NRS). Second, indications are identified. The primary and best validated indication for P-RA is isolated lower-limb trauma, especially suspected femoral neck or femoral shaft fracture (Steenberg & Møller, 2018).

The third step is to check for absolute contraindications, such as the patient's refusal (after the reasons for the procedure have been explained), signs of infection at the IC site to be punctured, or a known allergy to local anesthetics (Goldsmith et al., 2024).

The fourth step addresses relative contraindications requiring caution. Most salient are anticoagulant therapy or a history of coagulopathy. Deep blocks under these conditions are not recommended prehospital due to the risk of uncontrolled hematoma. Other relative contraindications include inability to maintain immobility (e.g., psychomotor agitation) and open fractures with heavy contamination. Although literature debates the risk of masking compartment syndrome, femoral nerve or fascia iliaca blocks are considered low risk in this regard, as these blocks are predominantly sensory and do not abolish pain on passive muscle stretch (Sonawane et al., 2022).

If an absolute or significant relative contraindication is identified, the protocol mandates a STOP-signal: the block is not performed. This is not a failure but a successful execution of the safety protocol. EMS then proceeds with standard systemic analgesia (e.g., intravenous opioids) and records the reason for withholding P-RA for hospital handover (see Chapter 3.1). If no contraindications are found, the team proceeds to block performance.

Techniques for Performing Basic Blocks in Field Conditions

The selection of techniques for the prehospital phase should be constrained to 2–3 of the safest, technically straightforward, and efficacious blocks. For femoral trauma, the femoral nerve block (Femoral Block, FB) and the fascia iliaca compartment block (FICB) meet these criteria.

A cardinal methodological requirement is the mandatory use of ultrasound (US) navigation. Deployment of portable ultrasound devices by emergency medical service (EMS) teams constitutes the technological backbone of P-RA safety. Ultrasound guidance (USG) enables real-time visualization of target structures and, critically, the needle and the spread of local anesthetic. This calculation may help reduce the risks of LAST due to inadvertent intravascular injection of local anesthetic and of iatrogenic nerve injury (Gao et al., 2023).

USG-FB is performed with a linear transducer placed transversely in the inguinal crease, with the patient supine and the leg slightly externally rotated. The femoral artery and the nerve are visualized lateral to the inguinal crease. An in-plane needle approach is used for needle placement. A 20- to 22-gauge, 80 to 100 mm long needle is then advanced from lateral to medial direction. After negative aspiration, 15 to 20 mL of local anesthetic (0.2% ropivacaine or 0.25% bupivacaine) is deposited until the desired perineural spread is achieved.

An alternative to the femoral nerve block is USG-FICB, a fascial-plane block. The fascial plane block is technically easy to perform, may be safer than selective nerve blocks, and more amenable to use by non-anesthesiologists in the prehospital environment. With the in-plane approach, the femoral artery is located, and the transducer is moved laterally to identify the iliacus muscle (m. iliacus) and the overlying fascia iliaca. The needle is guided below the fascia. If the aspiration test results are negative, 20 to 30 mL of local anesthetic is injected into the plane of the muscle, blocking the femoral and lateral femoral cutaneous nerves. Although a large body of evidence shows that the technique is relatively safe even when performed blindly, ultrasound guidance is the gold standard (Boselli et al., 2020). Table 1 presents comparative characteristics of basic prehospital blocks (USG-FB and USG-FICB).

Table 1. Comparative characteristics of basic prehospital blocks

Characteristic	Femoral nerve block (USG-FB)	Fascia iliaca compartment block (USG-FICB)
Target structure	Femoral nerve (lateral to the femoral artery)	Fascial compartment beneath the fascia iliaca
Technique	Targeted (selective) nerve block	Fascial plane/compartment block (plane block)
Difficulty level	Moderate (requires precise nerve identification)	Low (requires identification of the fascia)
Anesthetic volume	15–20 mL	20–30 mL
Potential safety	High (when performed under ultrasound). Risk of arterial or nerve puncture.	Very high. Low risk of vascular/nerve puncture.
Efficacy	Very high (rapid onset)	High (may require larger volume)

Equipment and Documentation Checklist

The reproducibility and safety of P-RA depend directly on the standardization of equipment and documentation processes. Every EMS team authorized to perform P-RA must be equipped with a unified kit.

The general items to include on the tray in Table 2 are: visualize equipment (a portable ultrasound machine with an appropriately sized high frequency linear probe, cover the sterile ultrasound probe and apply sterile ultrasound gel), include a sterile block set that has skin antiseptic solution, sterile swabs, and block needle (20-22G) with syringes and locally anesthetize such as with 0.2% ropivacaine or 0.25% bupivacaine. Third, a LAST protocol kit: 20% lipid emulsion (Intralipid) and standard resuscitation equipment (oxygen, bag-valve-mask, and laryngoscope) must exist along with the standard drugs in an immediately accessible area to deliver the emulsion intravenously if a systemic toxicity comes about. Equipment availability can be verified by using a pre-procedure checklist.

Table 2. Standardized checklist of equipment and documentation for prehospital RA

Category	Mandatory elements
Equipment (Ultrasound / Procedural)	1. Portable ultrasound machine with linear probe (> 7.5 MHz). 2. Sterile probe cover and sterile ultrasound gel. 3. Solution for aseptic skin preparation (e.g., chlorhexidine or povidone-iodine as per local protocol). 4. Sterile gloves, sterile swabs, syringes (20 mL, 10 mL). 5. Regional block needle (20–22G, 80–100 mm), echogenic tip. 6. Local anesthetic vial(s) , ropivacaine or bupivacaine in approved concentration.
Equipment (Safety / LAST preparedness)	1. 20% lipid emulsion (Intralipid) , immediately available. 2. Intravenous access equipment (IV cannulas, fluids, tubing). 3. Oxygen mask, bag-valve-mask (Ambu), laryngoscope, endotracheal tubes. 4. Patient monitor capable of ECG, blood pressure (NIBP/IBP), and SpO_2.
Documentation (Protocol / Record)	**Before block:** informed consent obtained; baseline NRS pain score; distal neurological examination; check for contraindications (including anticoagulant use). **During block:** block type (FB or FICB); technique (ultrasound guidance, in-plane/out-of-plane as used); aspiration result (note if negative/positive). **After block:** drug name; concentration (%); total volume (mL); time of procedure; NRS at 15–20 minutes; complications (if none, state no complications).

Documentation constitutes the second pillar of the seamless protocol. It should also include current essential information about the procedure and related data for the in-hospital staff. This information is collected in Table 2, which is part of the handover protocol (Chapter 3.1). Neurological status before procedure (to exclude any pre-existing neurological deficit), type of block, concentration, volume of local anesthetic used, time of the procedure, and the rate of pain relief according to the NRS before and after the procedure.

CHAPTER 2. TECHNIQUE OF CONTINUOUS AND MULTIMODAL ANALGESIA IN THE IN-HOSPITAL SETTING

For the perioperative analgesic regimen to be smooth, the in-hospital phase needs to be a continuation of analgesia that started prehospital. Ideally, a patient should arrive with a functioning regional block, the efficacy of which should be assessed, and included in the pain regimen (including continuous techniques and MMA) in hospital without delay.

Admission Protocol for a Patient with a Completed Block

Upon arrival of a patient with P-RA to the emergency department (ED), the anesthesia service or trauma team should proceed according to a precise algorithm, triggered by data provided by the EMS team (see Chapter 3.1).

The first step is verification of information. The receiving clinician must obtain precise data on the type of block performed, the anesthetic administered, its volume, and, critically, the time of injection. These parameters determine the expected duration of block action and the subsequent analgesic strategy.

The second step is clinical assessment of efficacy. The current pain level on the NRS should be evaluated, followed by a targeted sensory and motor examination in the block's innervation zone. For a femoral block, for instance, this includes assessing sensation over the anterior thigh and the ability to extend at the knee.

The third step is instrumental assessment (ultrasound). This step is pivotal for continuity. The in-hospital anesthesiologist should perform repeat ultrasound scanning. The aims are: to verify adequate anesthetic spread within the target plane, to exclude hematoma (critical if coagulation status is uncertain), and to evaluate anatomy for planning the placement of a continuous catheter. The whole algorithm is shown in Figure 2.

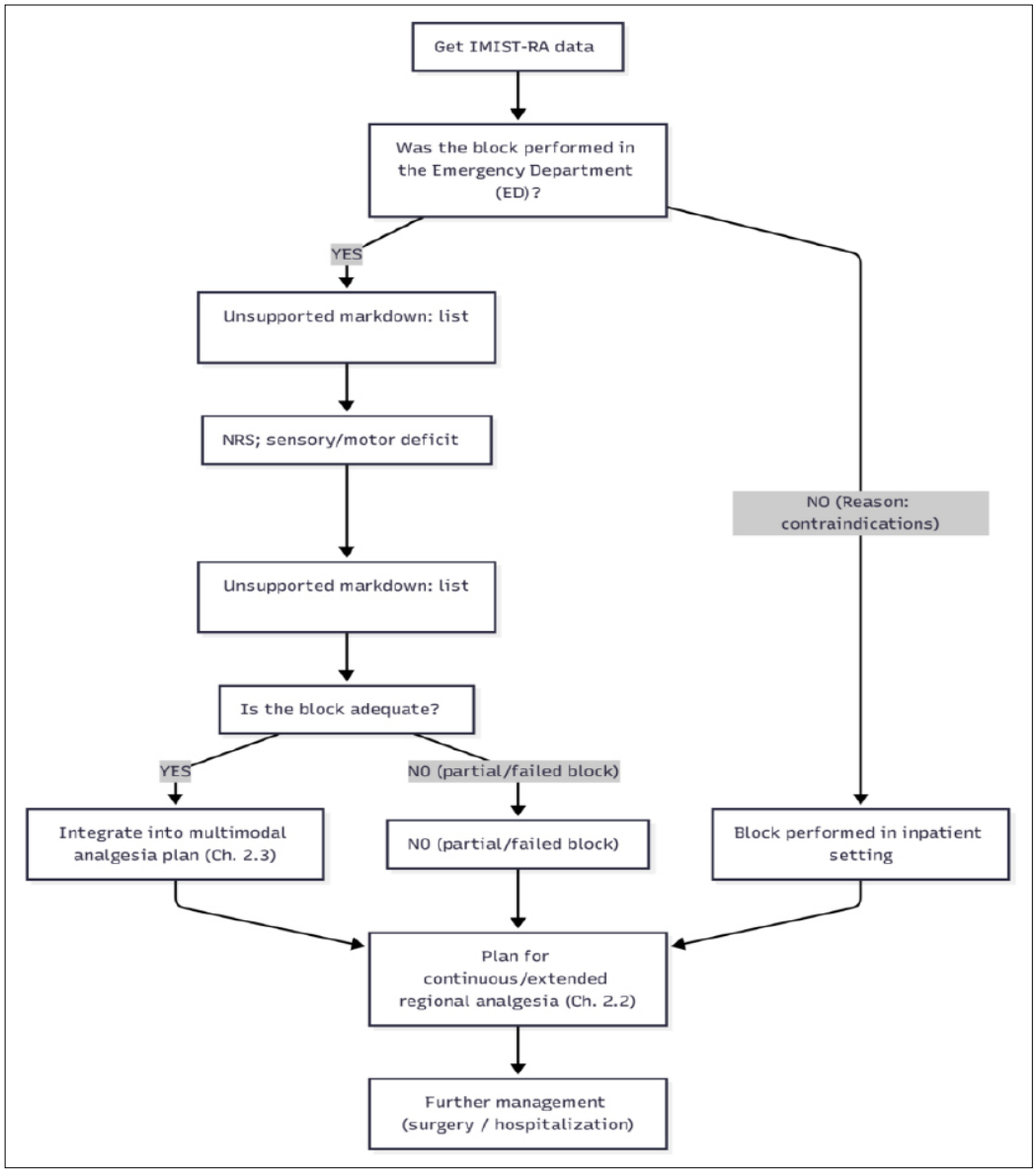

Fig. 2. Hospital algorithm for assessing a patient with prehospital RA

The fourth step is tactical decision-making. If P-RA achieves adequate NRS control, the patient is transferred to the relevant ward or operating room with a plan to integrate the block into MMA (see 2.3). Suppose the block is inadequate (partial or none). In that case, the anesthesiologist, guided by the ultrasound findings, decides on a repeat injection (top-up) or a de novo block performed under controlled in-hospital conditions. If P-RA was not performed prehospital due to contraindications (e.g., anticoagulants), the in-hospital stage is when risk is assessed and a decision is made about performing a block.

Techniques of Continuous Regional Anesthesia

A single-shot local anesthetic injection performed prehospitally provides adequate but time-limited analgesia (typically 6–18 hours) (Joshi et al., 2016). For injuries necessitating prolonged postoperative analgesia (e.g., hip arthroplasty), this single block should be converted to a continuous technique. This is achieved by placing a perineural catheter (PNC).

The transition from single-shot to continuous blockade is the culmination of the seamless approach. The presence of a functioning prehospital block (e.g., USG-FB) facilitates comfortable patient positioning in the operating room (e.g., for spinal anesthesia) and painless catheter placement. The catheter will then be inserted under ultrasound guidance close to the target nerve, such as the femoral nerve.

After placement, the catheter will be attached to an infusion pump, and a dilute solution of local anesthetic will be continuously infused to provide analgesia (not dense anesthesia or motor block) for early mobilization.

Standard infusion protocols, shown in Table 3, typically employ 0.2% ropivacaine (or equivalent) with a combination of basal rate and patient-controlled boluses (Patient-Controlled Regional Anesthesia, PCRA).

Table 3. Recommended infusion parameters for continuous femoral nerve block (CNFB) in the postoperative period

Parameter	Recommended value(s)	Rationale
Local anesthetic	Ropivacaine 0.2% (or Bupivacaine 0.1–0.125%)	Low concentration provides sensory analgesia with minimal motor block, facilitating mobilization.
Basal rate	4–6 mL/hr	Provides a continuous baseline level of analgesia.
Bolus (PCRA)	2–4 mL	Allows the patient to treat breakthrough pain (e.g., before physiotherapy).
Lockout interval	30–60 minutes	Safety interval to prevent drug accumulation and reduce the risk of toxicity.
Mode	Basal infusion + boluses (PCRA, patient-controlled regional analgesia)	The combination provides a better balance between continuous analgesia and total local anaesthetic consumption than basal infusion alone.

Principles of Multimodal Analgesia

Continuous regional anesthesia (PNC) should not be deployed as monotherapy. It serves as the foundation for the entire multimodal analgesia (MMA) strategy. The MMA concept entails the concurrent use of multiple analgesics and techniques acting at different nodes of the nociceptive pathway to achieve synergistic effects and reduce opioid requirements.

Within the proposed seamless methodology, the PNC (Chapter 2.2) provides baseline, continuous pain control by attenuating peripheral afferent input. This mitigates central sensitization and hyperalgesia.

Upon this foundation, depicted in Figure 3, additional MMA components are layered. A key principle is scheduled, rather than as-needed, administration of non-opioid analgesics. These include, first, paracetamol (acetaminophen) and, second, nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen or ketorolac (in the absence of contraindications).

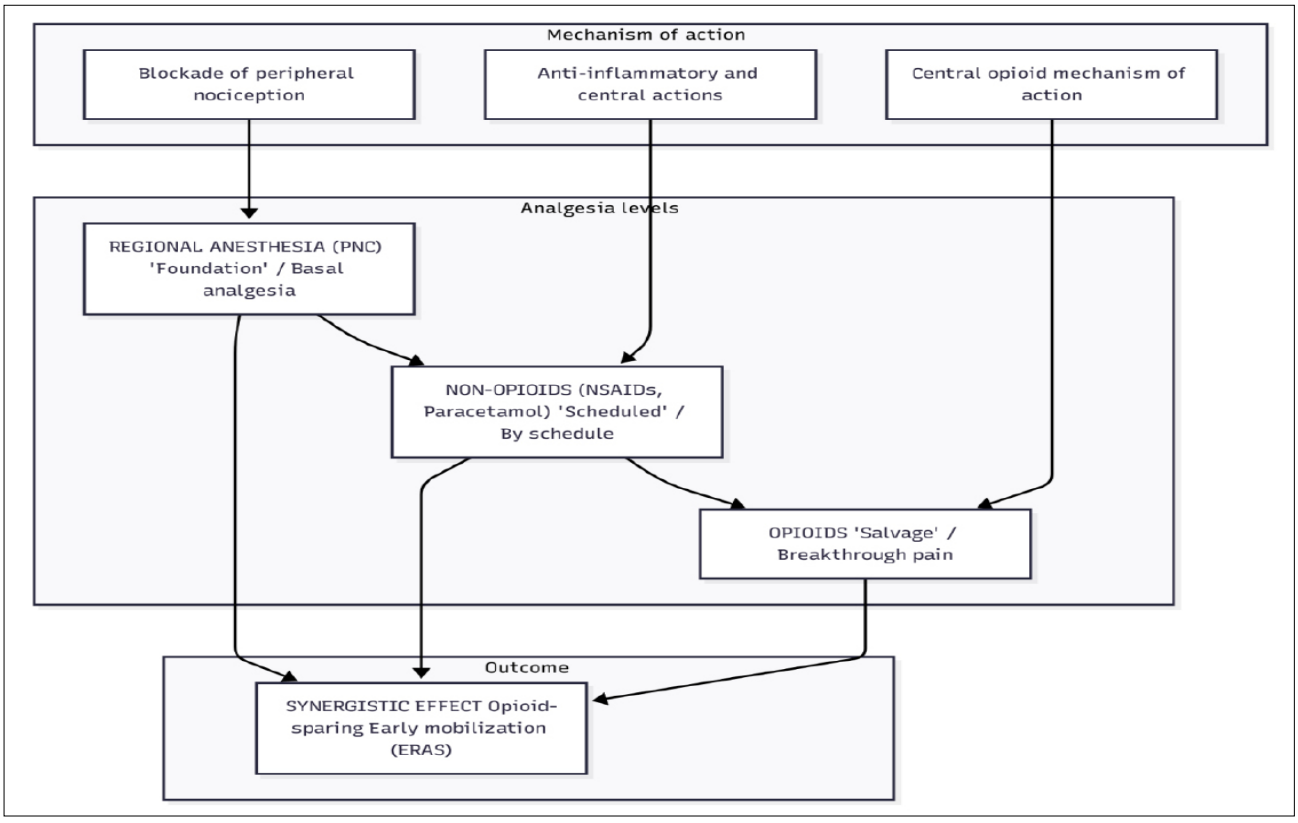

Fig. 3. Integrative model of multimodal analgesia (MMA) based on RA

The role of opioids within this schema is fundamentally recontextualized. From primary analgesics, they become third-line or rescue therapy. They are employed solely to manage brief episodes of breakthrough pain not controlled by PNC boluses and scheduled non-opioid agents.

Incorporating RA during MMA achieves some of the basic tenets of ERAS protocols, such as providing optimal analgesia to promote early mobilization and minimizing systemic opioid exposure. With reduced opioid exposure, adverse events such as sedation, postoperative nausea and vomiting, respiratory depression, postoperative delirium, and ileus that prolong recovery can be avoided or minimized.

CHAPTER 3. ENSURING A SEAMLESS HANDOFF AND EFFECTIVENESS ANALYSIS

The success of the integrated methodology depends not only on the technical execution of blocks (Chapter 1) and their continuation (Chapter 2), but also on the reliability of the informational bridge between these two phases. This chapter delineates the communication protocol that ensures seamlessness and the metric system for evaluating its effectiveness.

Author's Model of Communication and Data Transfer

Patient handover between different medical teams constitutes a point of maximal risk for patient safety. In the context of regional anesthesia, loss of information about the performed block (type, agent, time, complications) may precipitate inadequate analgesia, missed complications, or overdose risk during re-injection of an anesthetic.

Standard patient handover protocols such as SBAR (Situation, Background, Assessment, Recommendation) or IMIST-AMBO (Identification, Mechanism, Injuries, Signs, Treatment, Allergies, Medications, Background, Other) are effective for general trauma data transfer (Cowan et al., 2023). However, they lack a dedicated structure for conveying regional-anesthesia–specific information.

To address this gap, the author proposes the IMIST-RA model. This model is a modification of the validated IMIST protocol, with a mandatory additional RA (Regional Anesthesia) block integrated. This block structures all critical information compiled in the documentation checklist (Table 2).

The IMIST-RA protocol, shown in Table 4, should be transmitted via two conduits: first, electronically, from the EMS information system to the hospital's electronic health record (EHR), enabling the receiving team to prepare before the patient's arrival. Second, verbally, during the physical transfer in the emergency department, with mandatory readback of the block's key parameters (block, agent, volume) by the receiving clinician. The proposed protocol is depicted in Figure 4.

Table 4. Author's communication protocol IMIST-RA

Component	Content	Example transmission
I, Identification	Identification	Patient Ivanov I.I., 78 years. EMS crew 45.
M, Mechanism	Mechanism of injury	Fall at home from standing height.
I, Injuries	Injuries	Suspected closed fracture of the left femoral neck. Deformity and shortening.
S, Signs	Vital signs/findings	BP 150/90 mmHg, HR 95 bpm, SpO_2 98%. Baseline pain 9/10.
T, Treatment	Prehospital treatment given	IV cannula in the right cubital vein. 0.9% NaCl 250 mL.
-RA, Regional Anesthesia	Regional anesthesia performed (if applicable)	Block performed. Type: USG-FICB, left. Time: 14:30. Drug: Ropivacaine 0.2%, 30 mL. No complications. Neurology before and after intact. Current pain is 3/10.
-RA (Alternative), RA STOP-Signal	If the block is NOT performed or contraindicated	Block NOT PERFORMED. Reason: patient on Xarelto. Systemic analgesia given: Fentanyl 100 μg IV. Current pain is 6/10.

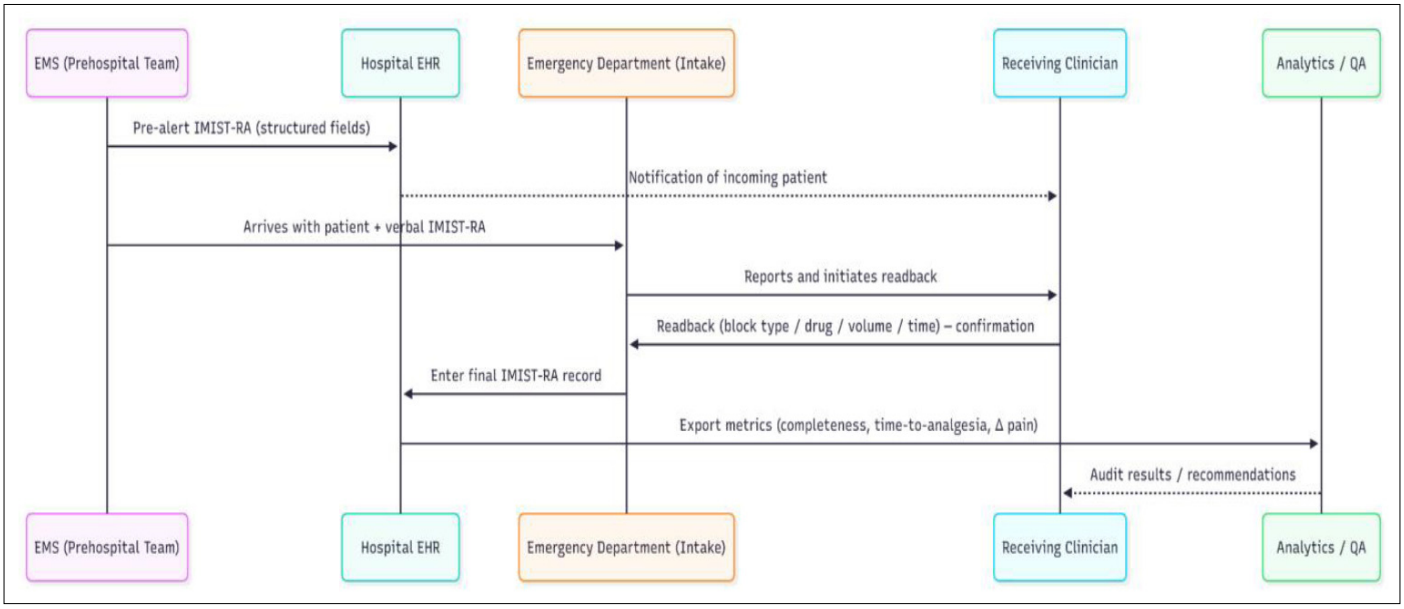

Fig. 4. The author's model of communication and data transfer

Key Performance Indicators (KPI) of the Integrated Approach

To assess the clinical and economic effectiveness of implementing the seamless P-RA protocol, an objective metrics system (KPIs) is required. These metrics must reflect both the immediate analgesic effect and the impact on overall treatment outcomes.

The key performance indicators are as follows. Reduction in pain intensity (NRS). This is the primary indicator. The NRS trajectory is measured from the moment of first EMS contact through 48 hours in the hospital. The target is an NRS decrease of 4 by the time of hospital admission.

Reduction in opioid consumption. This KPI is measured in morphine milligram equivalents (MME) for the first 24 and 48 hours of hospitalization. P-RA demonstrates a potent opioid-sparing effect, reducing fentanyl use in the prehospital phase and total inpatient opioid consumption by up to 80% (Tsai et al., 2022).

Time to first mobilization. This indicator is pivotal for ERAS protocols. Adequate analgesia without motor block and sedation (achieved through the combination of PNC and MMA) permits the earliest possible initiation of physiotherapy and patient activation (e.g., within 18–24 hours after surgery).

Complication rate. Monitoring encompasses complications related to P-RA itself (hematoma, LAST, nerve injury) and to opioids (delirium, nausea/vomiting, respiratory depression).

Analysis of Clinical Cases (Case Studies)

The practical application of the methodology is illustrated by two representative clinical cases that demonstrate both routine protocol operation and its operation in a STOP-signal safety mode.

Clinical Case 1: Successful Seamless Analgesia (Femoral Neck Fracture in an Older Patient)

A 78-year-old woman is found at home after a fall. Reports excruciating pain in the left hip, unable to move the leg. Objective findings: external rotation and shortening of the left lower limb. Baseline NRS 9/10.

Prehospital stage (Chapter 1): following operational implementation of the algorithm shown in Figure 1, the EMS team has a suspected diagnosis of a femoral neck fracture and has recorded no contraindications (allergy, infection, anticoagulation). Upon signing the consent, USG-FICB will be administered with 30 mL of 0.2% ropivacaine, as per the checklist in Table 2. Pain relief is expected to be satisfactory, with NRS decreasing to 3/10 at 20 minutes.

Handoff (Chapter 3.1): An electronic IMIST-RA report (Table 4) with complete block data is transmitted to the hospital. During handover, verbal confirmation is provided: USG-FICB at 14:30, ropivacaine 0.2% 30 mL, NRS now 3/10.

In-hospital phase (Chapter 2): In the emergency department, the anesthesiologist conducts an assessment per Scheme 2. Ultrasound confirms correct anesthetic distribution. The patient tolerates transport and OR positioning comfortably. A continuous perineural catheter (PNC) is placed (Table 3). MMA is initiated (Figure 3), including scheduled paracetamol and NSAIDs.

Outcome (Chapter 3.2): Opioid requirement over the first 48 hours, 0 MME. The patient is mobilized with a physiotherapist 18 hours postoperatively. No episodes of delirium are recorded.

Clinical Case 2: Protocol in the Presence of Contraindications (Trauma in a Patient on Anticoagulants)

A 65-year-old man is extricated from a vehicle after an MVC. Complaints of right thigh pain, NRS 8/10. History notable for atrial fibrillation; patient takes rivaroxaban (Xarelto) continuously.

Prehospital phase (Chapter 1): The EMS team follows the algorithm (Figure 1). A relative contraindication to a deep block is identified: intake of a direct oral anticoagulant. The protocol mandates a STOP signal. P-RA is not performed. Intravenous access is established; fentanyl 100 μg is administered; NRS decreases to 6/10.

Handoff (Chapter 3.1): Transfer via IMIST-RA (Table 4). In the RA block, it is clearly stated: Block NOT PERFORMED. Reason: Xarelto intake. Fentanyl 100 μg administered.

In-hospital phase (Chapter 2): The ED anesthesiologist is alerted to the coagulation status and the suboptimal efficacy of systemic analgesia. Ultrasound assessment is performed (Figure 2), excluding active bleeding. In the controlled hospital setting, where monitoring and emergent intervention are available, the anesthesiologist decides to conduct a more superficial block (FB) under meticulous ultrasound guidance.

Outcome: The protocol demonstrates flexibility and safety. It averts a potentially hazardous field intervention while preserving information continuity, enabling the hospital team to make a rapid, appropriate tactical decision.

Therefore, these clinical cases highlight that this combined regional anesthesia approach provides a truly smooth analgesic pathway from prehospital to inpatient with both high and consistent analgesia (the nurse reported NRS from 9 to 3 and no opioid was administered in the first 48 h in the first case) plus a high level of safety (the STOP-signal from the rivaroxaban triggered field block, and the rationale for avoiding a dangerous field block to the in-hospital team). Standardized checklists, an electronic IMIST-RA report, and timely interlinking communication between prehospital and in-hospital teams ensured continuity of care and that the in-hospital team had all necessary information to make an informed decision. These examples confirm the protocol's

practical applicability and adaptability across diverse clinical scenarios.

CONCLUSION

The proposed integrated methodology constitutes a fundamental shift from a fragmented, reactive analgesic model to a proactive, continuous, and controllable process. Analysis indicates that the traditional gap between prehospital and in-hospital phases, resulting in periods of inadequate analgesia (oligoanalgesia), can be successfully eliminated through implementation of unified protocols.

The principal conclusions are as follows.

Standardization of P-RA (Chapter 1), grounded in precise algorithms (Figure 1) and mandatory ultrasound use, is a safe and effective strategy for immediate, high-quality analgesia in limb trauma.

A seamless transition (Chapter 3) is ensured not only by the technical performance of the block but primarily by the adoption of the specialized IMIST-RA communication protocol (Table 4), which guarantees 100% continuity of critical information.

Integration of P-RA into inpatient practice (Chapter 2) enables its use as a bridge to continuous catheter techniques (Table 3) and as the foundation for multimodal, opioid-sparing analgesia (Figure 3).

The effectiveness of the integrated model is corroborated by measurable KPIs (Chapter 3.2), foremost a significant reduction in NRS pain intensity, a radical decrease in opioid requirements, and a shortened time to mobilization.

The practical significance of the methodology extends beyond mere enhancement of patient comfort. Improved outcomes are achieved through mitigation of systemic complications directly linked to inadequate pain control and high opioid consumption, such as postoperative delirium, respiratory disturbances, and pain chronification. Increased patient satisfaction constitutes an additional salient result. From a health-systems perspective, the protocol enables optimization of clinical operations by shortening decision times in the ED, reducing staff burden through more stable patient status, and potentially shortening overall length of stay within ERAS frameworks.

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